



COMPARATIVE STUDY OF CASE BASED LEARNING WITH TRADITIONAL TEACHING METHODS IN BIOCHEMISTRY FOR FIRST YEAR MEDICAL STUDENTS

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ABSTRACT **Background:** Case based learning (CBL), is a learning method aids learner to reorganize, elaborate their information and provide connection between current and new information. Moreover CBL is student centered, taken in small groups where teacher acts as facilitator or guide. This study was planned to perceive the need for initiating CBL, this study aimed to compare the biochemistry teaching among first year medical students with that of traditional teaching. **Methods** This is an observational study conducted from August 2021 to December 2021. This research study was conducted on 99 students of First year MBBS students. Ten ideal case scenarios on the topic of protein energy malnutrition (PEM) in children and acid base balance were prepared, and pre validated by the faculty of Biochemistry, Paediatrics and Surgery medical education department in our institution. CBL was introduced and total three sessions were conducted and compared with traditional teaching. **Results** The mean (\pm SD) value of the score of gain in knowledge was 3.90 ± 1.86 ($n=99$) for the batch of students who attended case based learning while the mean (\pm SD) gain in knowledge for the batch who underwent, traditional learning (TL) was 2.60 ± 2.29 ($n=99$). A paired t-test comparing didactic lectures with self-directed learning showed that the scores following didactic lectures were more compared to SDL and the results were statistically significant. An unpaired t-test comparing case based learning to SDL also showed statistically significant gain in knowledge following didactic lectures. **Conclusion** This study clearly showed that CBL is more effective over traditional teaching for our first year MBBS students and for covering a wider area.

KEYWORDS : Case based learning, traditional learning

INTRODUCTION

The Govt. of India expect Medical Education as a tool to produce "Physicians of First Contacts" to achieve National Goal of health for All. The quality of medical education depends upon various factors like faculty expertise in the subject and their knowledge, exposure and training in teaching learning methodology. Moreover medical education in the past decade is now becoming student centric from teacher centre mode. Therefore, student opinion and preferences matter the most before introduction of any additions, deletions or modifications in the way the course is conducted. We also have to consider that students are coming from different places and represent a population sample which differ in age, level of mental preparedness and their preferences for learning styles^{1,2,3}. Considering all these points, the present study is done. Therefore, it becomes a responsibility of any medical teacher to meet the individual educational need of the students regarding the knowledge, attitude, and the skill. One of the most important ways to strengthen the medical education at content delivery level is to assess student perception about teaching learning methodology.^{4,5,6}

According to researchers, Self-directed learning (SDL) is an individual's behavior towards learning.⁷ In this technique individual decide themselves at what depth and breadth they need to learn.⁸ They formulate their own learning goals, identify reading material and implement appropriate learning strategies, in contrast to traditional method of teaching in which a teacher delivers to a large audience of students.⁹ There have been several attempts to compare lecture with self-directed alternate forms of learning. Although a few studies suggest self learning groups performed better than traditional large group lectures,^{10,11,12,13} other studies have reported self study group to be equivalent to group plus traditional classroom teaching.^{14,15,16}

Objectives: To evaluate the teaching methods for imparting education to 1st MBBS students.

METHODS

Study Design- observational study.

Study Population- First year medical students of Acharya Shri Chander College of Medical Sciences, Sidhra, Jammu and Kashmir.

Inclusion Criteria: First year MBBS students who gave consent and participated in the sessions were included in the study.

Exclusion Criteria: Students who were unable to attend the programme. This is an observational study conducted from August 2021 to December 2021 on 99 students of First year MBBS. Understandable idea of the research project was given to all the students and consent was taken from students who were willing to participate in this project. Ten ideal case scenarios on the topic of protein energy malnutrition and acid base balance were prepared, and pre-validated by the faculty of Biochemistry, Surgery and Pediatric department.

Specific learning objects (SLO) were decided. The questions were intended that the students can correlate the clinical manifestations with the biochemical aspects. The students involved in the study had not received lecture classes on the same topics previously. Cases were shown during the session and students were given 10 minutes time to read, discuss and interpret among the group. Later the questions were projected and students were given a chance to respond. Faculty facilitated the learning process, discussed relevant points and summarized towards each case scenario.

First intervention

Three sessions each of 40 minutes using TTM were taken on the topic of protein energy malnutrition and acid base balance. Pre and post-test was taken on the traditionally taught topic, consisted of multiple question answer (MCQ) of 20 marks within the time period of 15 minutes.

Second intervention

CBL was introduced and total three sessions were conducted. During 1st session, cases studies on protein energy malnutrition and acid base balance were introduced to the students and relevant study material references were given. 2nd session was given to the students for reading to find the learning trigger, discuss, explore, compose and finally reflect. In the groups there was one leader, one time keeper, one scribe, and teacher as facilitator. In 3rd session there was discussion, briefing by faculty followed by post test. Unpaired t-test was applied for comparison between the scores obtained in post -test of both teaching methods.

RESULTS

Even though, there was a statistically significant gain in knowledge with both methods of learning, didactic lectures edged over self-directed learning methods. For the purpose of analysis, the marks of students who underwent traditional lectures on both days were

grouped together while the marks of students who attended the self-study sessions on both days were also grouped together.

Assessment of Knowledge Gained by Different Teaching Methods
After conducting the two types of teaching methods, the gain in knowledge was assessed by pre-test and post-test for each batch. The mean (\pm SD) value of the score of gain in knowledge was 3.90 ± 1.86 ($n=99$) for the batch of students who attended case based learning while the mean (\pm SD) gain in knowledge for the batch who underwent SDL was 2.60 ± 2.29 ($n=99$).

Independent t-test done for the same showed statistical significance (Table 1).

Comparison of Both Teaching Methods

A paired t-test comparing didactic lectures with self-directed learning showed that the scores following didactic lectures were more compared to SDL and the results were statistically significant (Table 2). An unpaired t-test comparing case based learning to SDL also showed statistically significant gain in knowledge following didactic lectures (Table 3).

Table no 1 Comparison of Gain in Knowledge among the Two Lecture Methods (Independent t-test)

T-L Methods	Number of students	Knowledge gain	P value
CBL	99	3.90 ± 1.86	0.001
Traditional Teaching	99	2.60 ± 2.29	0.001

Table no.2 Comparison of Pre-Test and Post-Test Scores (Paired t-Test)

T-L Methods	Number of students	Pre-Test Mean \pm SD	post -test Mean \pm SD	P value
CBL	99	6.55 ± 1.715	10.45 ± 1.391	0.001
Traditional Teaching	99	9.10 ± 1.550	9.10 ± 1.550	0.001

Table no 3 Unpaired t-Tests Comparing Case based learning to Traditional learning

T-L Methods	t value	P value
CBL	4.35	0.000
Traditional Teaching		

DISCUSSION

The present study shows that the gain in knowledge was significant in both groups, more in the group, which attended the lecture classes. This shows that lecture classes are more effective in learning those particular topics. Overall, in the present study, case based learning has proved to be better than self-directed learning for understanding certain topics in medical education. This is in support of many of the previous studies, which showed a significant advantage for CBL over traditional lectures^{17,18,19}. In a study of self-directed learning in relation to anatomy, gross dissection at the Medical School of the University of Castilla-La Mancha, Spain, and Mdel et al found that an objective-oriented self-learning approach provides maximal autonomy and independence in the achievement of objectives by the students in close association with academic staff. The data obtained from the study indicated that students engaged in self directed learning through small groups working with faculty staff are able to self-improve their anatomical skills.²⁰

A study done by Abraham RR et al at Melaka Manipal Medical College to determine the effectiveness of CBL, compared SDL session evaluation scores with case based learning exam scores using Students paired t-test. Lecture exam scores were significantly lower than CBL exam scores (72 ± 0.40 vs. 76 ± 0.21). These results suggest that CBL may be an effective learning tool. Murad et al implied that CBL is more suitable for adult learners who already have a reservoir of knowledge and can apply their learning immediately to their practices and recommended it for heterogeneous groups of learners with different past experiences.²¹

The role of SDL is probably limited in first year as the students are not exposed to clinical postings and it may be difficult for them to integrate the clinical aspects of a disease with biochemistry. A teacher facilitated discussion or a short lecture class, followed by self-study sessions maybe better in this setting.

Limitation of the Study Sample size was small representing a single medical college, which can be biased. This can be ruled out by taking a large sample size by conducting the study simultaneously at multiple centres.

Conclusion We are not claiming that our study is judgemental. We have tried to put the facts in the current scenario in the best possible manner. The preferences and suggestions regarding learning style methodology should be taken into consideration while making curriculum and future strategies to impart better medical education and to strength health care system at institutional level. This will help to produce better Indian medical graduates of international standards.

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